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10/631,148	07/31/2003	Ron Maurer	100110348-1	6500

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EXAMINER	
CHU, RANDOLPH I	
ART UNIT	**PAPER NUMBER**
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/631,148	MAURER, RON	
	Examiner	Art Unit	
	Randolph Chu	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *5/9/2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6, 9, 10, 13 and 31-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1,3-6,9,10 and 13* is/are allowed.

6)☒ Claim(s) *31 and 33-35* is/are rejected.

7)☒ Claim(s) *32 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to applicant's amendment received on May 9, 2007, all requested changes to the claims have been entered.

Response to Argument

2. Applicant's arguments filed on May 9, 2007 have been fully considered but they are not persuasive.

Applicant's argue on page 11 of the response that August's application of a Taylor series expansion does not provide a directly useful result and it is applicable to an entirely different type of filter.

The examiner disagrees. Taylor series is a representation of a function. And the prior art of August's filter is used for enhancement of contours in image. (see para [0001]-[0003]. And there is nothing in claim 31 that preclude the use of Volterra filter or Tansors and generalized cummulant. Claim 31 merely recites using Taylor series expansion. The applicant is reminded that claim 31 is using "comprising" which does not preclude the reference from having additional feature.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 31 are rejected under 35 USC 103(a) as being unpatentable over Tomasi and Manduchi ("Bilateral filtering for gray and color images", Proc. IEE Intl. Conf. on Computer Vision, Bombay, India, 1998) in view of August (US 2003/0156762).

Tomasi and Manduchi teach all the limitations of claim 1 as applied above from which claim 2 respectively depend. Tomasi and Manduchi teaches Tomasi and Manduchi teaches for each pixel location in the image into a sum of the original signal value of a central pixel at said pixel location (When $d(\xi,x)=0$, then $c(\xi,x)=1$ and When $s(f(\xi),f(x))=0$, then $\delta(f(\xi),f(x))=1$) and a bilateral correction term which is a function of local signal differences between the central pixel and its neighbors($f(\xi)c(\xi,x)$, $f(\xi)s(f(\xi),f(x))$) (Equation (1) and (3));

processing the image using the bilateral filter to generate a filtered output (2. The Idea); processing each pixel (i) in the image with determined by the size of the bilateral filter convolution kernel Kj; and calculating a filtered value for said pixel (i) using a bilateral filter with computer (2. The Idea, Fig. 3). So it is clear that a neighborhood of said pixels are buffered while processing the image using filter as to form the neighborhood, pixels from multiple lines/columns are needed.

Tomasi and Manduchi does not disclose expressly that filter is normalized expression implemented as a Taylor series expansion.

August teaches that filter is normalized expression implemented as a Taylor series expansion (para. [0355]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Taylor series expansion to implement filter normalization in the method of Tomasi and Manduchi.

The suggestion/motivation for doing so would have been that simpler and efficient bilateral filtering can be achieved by using higher order local approximation.

Therefore, it would have been obvious to combine August with Tomasi and Manduchi to obtain the invention as specified in claim 2.

5. Claim 33 is rejected under 35 USC 103(a) as being unpatentable over Tomasi and Manduchi ("Bilateral filtering for gray and color images", Proc. IEE Intl. Conf. on Computer Vision, Bombay, India, 1998) in view of August (US 2003/0156762) and in further view of mathworld.com (http://mathworld.wolfram.com/TaylorSeries.html).

With respect to claim 33, Tomasi and Manduchi in view of August teach all the limitations of claim 31 as applied above from which claim 3 respectively depend.

Tomasi and Manduchi does not disclose expressly that Taylor series expansion is implemented as a truncated infinite geometric sum.

mathworld.com teaches that function can represented as Taylor series of truncated infinite sum.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use truncated infinite sum as Taylor series expansion in the method of Tomasi and Manduchi in view of August.

The suggestion/motivation for doing so would have been that function can be represented or approximated by Taylor series as a sum of infinite terms.

Therefore, it would have been obvious to combine mathworld.com with Tomasi and Manduchi to obtain the invention as specified in claim 33.

6. Claim 34 is rejected under 35 USC 103(a) as being unpatentable over Tomasi and Manduchi ("Bilateral filtering for gray and color images", Proc. IEE Intl. Conf. on Computer Vision, Bombay, India, 1998) in view of August (US 2003/0156762) and in further view of Harashima et al. (US 5,710,875).

Tomasi and Manduchi in view of August teach all the limitations of claim 2 as applied above from which claim 34 respectively depend.

Tomasi and Manduchi does not disclose expressly that Taylor series expansion is implemented using an order of expansion of zero.

Harashima et al. teaches that function can represented as Taylor series of truncated infinite sum.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Taylor series implemented using an order of expansion of zero in the method of Tomasi and Manduchi in view of August.

The suggestion/motivation for doing so would have been that function can be simplified by Taylor series that omitting the terns remaining after the first order.

Therefore, it would have been obvious to combine Harashima et al. with Tomasi and Manduchi to obtain the invention as specified in claim 34.

7. Claim 35 is rejected under 35 USC 103(a) as being unpatentable over Tomasi and Manduchi ("Bilateral filtering for gray and color images", Proc. IEE Intl. Conf. on Computer Vision, Bombay, India, 1998) in view of August (US 2003/0156762) and in further view of Verron ("The Taylor series for Bandlimited Signals, J.Austral Math Soc Ser B 36 (1994) pg 101-106).

Tomasi and Manduchi in view of August teach all the limitations of claim 2 as applied above from which claim 5 respectively depend.

Tomasi and Manduchi does not disclose expressly that Taylor series expansion is implemented as a truncated infinite product.

Verron teaches that function can represented as Taylor series of a truncated infinite product (Power series) (abstract).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use truncated infinite product as Taylor series expansion in the method of Tomasi and Manduchi in view of August.

The suggestion/motivation for doing so would have been that function can be represented or approximated by Taylor series as a product of infinite terms.

Therefore, it would have been obvious to combine Verron with Tomasi and Manduchi to obtain the invention as specified in claim 35.

Allowable Subject Matter

8. Claims 1, 3-6, 9, 10, 13 are allowed.

The following is an examiner's statement of reasons for allowance:

Claims 1, 10 and 13 are allowable over the prior art of record because non of the prior art of record teaches the combined claimed elements as set forth in the claim 1, 10 and 13.

None of the prior art of record teaches or fairly suggests that image processing method for processing an image using a bilateral filter that pre-calculating the product of the photometric weight for each neighboring pixel j and the signal difference Δfj between pixel j and center pixel i, to produce a signal value PSI (Δfj) representing the influence of neighboring pixel j; storing each said value of PSI in a look-up table; and using a value of PSI in the look-up table corresponding to an instant value of Δfj to calculate the contribution of the neighboring pixel j, by multiplying the value for pixel j with a corresponding convolution kernel coefficient Kj, and together with combination of other

claimed elements as set forth in the independent claims 1, 10 and 13. Therefore, the claim 1, 10 and 13 are over the prior art of records.

Claim 9 is allowable over the prior art of record because non.of the prior art of record teaches the combined claimed elements as set forth in the claim 1, 10 and 13.

None of the prior art of record teaches or fairly suggests that image processing method for processing an image using a bilateral filter that pre-calculating the photometric weight g(Δfj); storing each said value of photometric weight in a look-up table; and using a value of g in the look-up table corresponding to an instant value of a signal difference in one or more color-channels Δfj to compute the bilateral weight of a neighboring pixel j, by multiplying the value for pixel j with a corresponding convolution kernel coefficient Kj; computing a bilateral correction term for each of the color channels, by multiplying the calculated bilateral weight of the neighboring pixel j with the signal differences Δcj corresponding to each of the color channels; and adding each of the computed bilateral correction terms to the central pixel value for the corresponding channel, and together with combination of other claimed elements as set forth in the independent claims 9. Therefore, the claim 9 is over the prior art of records.

9. Claims 32 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable of rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randolph Chu whose telephone number is 571-270-1145. The examiner can normally be reached on Monday to Thursday from 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on 571-272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RIC/

SAMIR AHMED
PRIMARY EXAMINER